$$\iint_{\mathbb{R}^2} e^{-x^2-y^2}\,dA = \int_0^{2\pi}\int_0^{\infty} e^{-r^2}\, r\,dr\,d\theta$$

$$\int_0^{2\pi}\left(\lim_{t\to\infty}\int_0^t e^{-r^2}\, r\,dr\right)d\theta$$

$$\int_0^{2\pi}\lim_{t\to\infty}\left(-\tfrac{1}{2}e^{-r^2}\right)\Big|_0^t\,d\theta$$

$$\int_0^{2\pi}\lim_{t\to\infty}\left(-\tfrac{1}{2}\underbrace{e^{-t^2}}_{\to 0}+\tfrac{1}{2}e^{0}\right)d\theta$$

$$\int_0^{2\pi}\tfrac{1}{2}\,d\theta$$

$$\tfrac{1}{2}\theta\Big|_0^{2\pi}$$

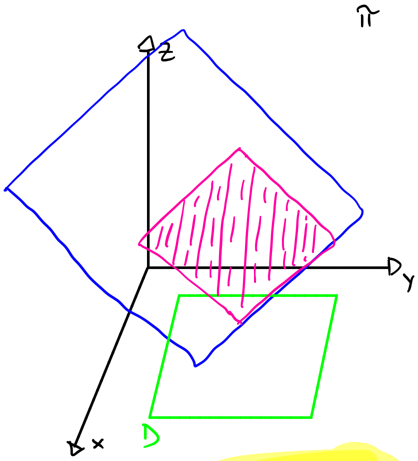
$$\pi$$

$u=-r^2$

$du=-2r\,dr$

$-\frac{1}{2}du = r\,dr$

$-\frac{1}{2}e^{-r^2}\Big|_0^t$




$S = 21\sqrt{35}$

$z = 5 + 3x + 5y$

$[0,3]\times[1,8]$

$$S = \iint_D \sqrt{f_x(x,y)^2 + f_y(x,y)^2 + 1}$$

$f_x = 3 \quad f_y = 5$

$$\iint_D \sqrt{9+25+1}$$

$$\int_1^8\int_0^3 \sqrt{35}\,dx\,dy$$

$$\int_1^8 \sqrt{35}x\Big|_0^3\,dy$$

$$\int_1^8 3\sqrt{35}\,dy$$

$$3\sqrt{35}\,y\Big|_1^8$$

$$24\sqrt{35} - 3\sqrt{35}$$

$$21\sqrt{35}$$

$26 = 2x + 13y + z$

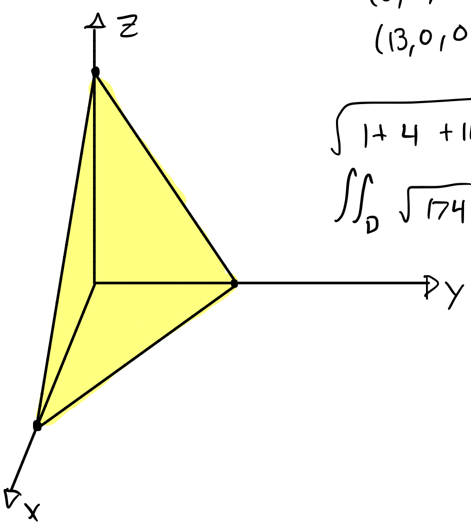
$(0,0,26)$

$(0,2,0)$

$(13,0,0)$

$z = 26 - 2x - 13y$

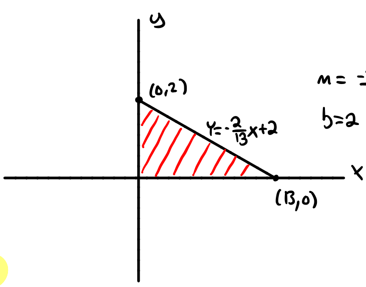
$f_x = -2 \quad f_y = -13$




$$\sqrt{1+4+169}$$

$$\iint_D \sqrt{174}\,dA$$

$13\sqrt{174}$




$m = \frac{-2}{13}$

$b = 2$

$y = -\frac{2}{13}x + 2$

$$\int_0^{13}\int_0^{-\frac{2}{13}x+2} \sqrt{174}\,dy\,dx$$

$$\int_0^{13}\left[\sqrt{174}\,y\right]_0^{-\frac{2}{13}x+2}dx$$

$$\int_0^{13}\sqrt{174}\left(-\tfrac{2}{13}x+2\right)dx$$

$$\sqrt{174}\int_0^{13} -\tfrac{2}{13}x+2\,dx$$

$$\sqrt{174}\left[\tfrac{-2}{26}x^2+2x\right]_0^{13}$$

$$\sqrt{174}\left[-\tfrac{1}{13}x^2+2x\right]_0^{13}$$

$$13\sqrt{174}$$

$-\frac{1}{13}\times 169 + 2(13)$

$-13 + 26$